

and let's not get too attached to our therapeutic triumphs which are largely anecdotal. Remember that our understanding of higher brain function is foggy at best. The best example of our rank ignorance in this field is to look at the scholastically brilliant overachievers at the other end of the educational spectrum. Among the latter group we must concede that we have no effective way of identifying in the long term the person who will be most effective and productive in his chosen field, regardless of whether you're selecting executives for IBM or candidates for medical school.

Concede that these children are clearly a mixed diagnostic bag, some with constitutional personality traits that lead to rebellion and maladjustment in the social artifact we call a classroom, some from broken and disturbed homes where food, shelter and clothing represent far more real challenges than mastery of reading, writing and arithmetic, some bright and gifted daydreamers whose only escape from the boring classroom humdrum is to buck the system by play-acting their dreams and fantasies and some whose deviant behavior results from actual neuronal damage. And to the physician whose primary responsibility is to identify disease, to treat it and to counsel parents when he identifies something untreatable, I would say in the current idiom, "Do your own thing." Manage every patient individually, try to make an accurate diagnosis and, when you get to the edge of your orbit, ask for help from other real specialists—the psychologists and educators.

Last, let's agree to study the problem carefully if it's that important and let's restrain our emotional attachments to a vague concept that in its essence is extremely complicated until we have something that resembles scientific evidence. If we decide to study the problem scientifically, let us plan the study in advance, define our terms, frame the questions carefully, agree to be patient while data are being collected and avoid trying to pool unpoolable data. More, let us invite the biometrists and geneticists to join the clinicians in planning the study and be especially careful about deriving conclusions about the effects of drugs on behavior especially if the observations are not controlled with the use of double-blind and placebo techniques that will lend credibility to the results.

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## Acid-Base Changes During and Following Cardiac Resuscitation

DURING THE PAST DECADE, the importance of changes in acid-base balance occurring during resuscitation from cardiac arrest has been recognized with increased frequency. The report by Carrasco and Oletta<sup>1</sup> in this issue of *CALIFORNIA MEDICINE* emphasizes the severity of acid-base abnormalities detected during cardiac arrest, even when they occur in the most favorable situations for resuscitation—that is, in the operating room or in specialized diagnostic laboratories. This report also documents that serial follow-up measurements of pH, pO<sub>2</sub> and pCO<sub>2</sub> following resuscitation are essential for continuing care and for determining ultimate prognosis. Several practical and theoretical issues raised by these investigators merit further discussion.

First, the duration of cardiac arrest before it is recognized, and any delay in establishing adequate ventilation and circulation after recognition of arrest, have an important influence on the severity of the acidosis, and as indicated, on the ultimate survival of the patient. Metabolic and respiratory acidosis in combination appears to indicate a poorer prognosis, probably reflecting the fact that neither the circulation nor ventilation was restored adequately. Occasional over-correction of acidosis occurs during the initial resuscitation attempts, due to the administration of too much bicarbonate. Frequent measures of pH during resuscitation permits one to avoid this consequence. Furthermore, since many patients who experience cardiac arrest have underlying cardiac or pulmonary disorders which predispose to acid-base abnormalities, sequential measurement of pH, pO<sub>2</sub> and pCO<sub>2</sub> during a period of 24 to 48 hours after cardiac arrest seems essential. There are obvious complexities in managing those who are gravely ill and require assisted ventilation, gastric suction and intravenous feeding, and who have abnormal hepatic and renal function in their recovery from cardiac arrest. Clearly, those who remain unconscious due to central nervous system hypoxia, those who have inadequate restoration or permanent damage to the circulatory system and again develop metabolic acidosis because of inadequate oxygenation, those having major cardiac damage with pulmonary edema, and those who have long periods of arrest

before treatment, thus developing severe metabolic derangements, will have a poor prognosis for recovery.<sup>1,2</sup>

Second, in developing treatment programs for patients during cardiac resuscitation, emphasis should be given to several factors: (a) adequate ventilation, which frequently requires endotracheal intubation,<sup>3</sup> (b) the administration of bicarbonates based on frequent measurements of pH, since no formula for its administration can be established for every patient,<sup>4</sup> (c) the management of the entire medical and surgical problem of the patient by an experienced and practiced team in the hospital, and (d) the early recognition of the cardiac arrest. In many instances in an operating room or a special procedures diagnostic room, ventricular fibrillation can be recognized and terminated electrically before alterations in acid-base occur.

Third, patients who have cardiac arrest frequently have an abnormal acid-base status before the arrest,<sup>5</sup> due to underlying disease and/or prior drug therapy. Ultimate recovery depends not only upon excellent medical management, but upon the severity of the underlying disease.

Finally, correction of acid-base abnormalities in patients during and following cardiac arrest is important to restore the effectiveness of drugs such as catecholamines and antiarrhythmic agents, to prevent the recurrence of cardiac arrhythmias, which may be enhanced by the abnormalities, and to restore the function of vital organs such as the brain, heart, lungs and kidneys.

Clearly, the recognition of altered acid-base status and its correction during the resuscitation is of critical importance. Serial determinations to guide therapy for 24 to 48 hours afterward are required in many patients. The initial severity of the acidosis and its recurrence, considered together with the clinical status of the patient and his underlying disease, permit a prediction of the ultimate prognosis, as is stressed by Carrasco and Oletta.<sup>1</sup>

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#### REFERENCES

1. Carrasco HA and Oletta JF: Evolution of the acid-base status in cardiac arrest. *Calif Med* 118:7-12, June 1973
2. Johnson AL, Tanser PH, Ulan RA et al: Results of cardiac resuscitation in 552 patients. *Amer J Cardiol* 20:831-836, 1967
3. Fillmore SJ, Shapiro M and Killip T: Serial blood gas studies during cardiopulmonary resuscitation. *Ann Intern Med* 72:465-469, Apr 1970
4. Chazan JA, Stenson RE and Kurland GS: The acidosis of cardiac arrest. *New Engl J Med* 278:360-364, Feb 1968
5. Camarata SJ, Weil MH, Hanashiro PK et al: Cardiac arrest in the critically ill—I. A study of predisposing causes in 132 patients. *Circulation* 40:688-695, Oct 1971

## Where We Stand on Drug Abuse

"WHERE WE STAND ON DRUG ABUSE," a statement which appears elsewhere in this issue, was prepared by the California Medical Association's Committee on Alcoholism and the Committee on Dangerous Drugs, endorsed by the Scientific Board and the Council, and accepted by the House of Delegates in March 1973. It is our understanding that this statement was more than a year in preparation and underwent several revisions. The document as finally approved represents one of the most carefully prepared and thoughtfully reviewed official statements on the subject by the medical profession to be found anywhere.

The statement is to be commended on two grounds. First and most important, it reflects the present state of the scientific knowledge concerning drug abuse and well-informed scientific and professional opinion as to how this knowledge might best be used at this time to deal with our admittedly serious drug abuse problem. This is its most significant contribution and the one which will have the most effect on patient care and the betterment of the public health. But the report also is one of the most carefully developed official statements ever adopted by the California Medical Association. It reflects not only the expertise of the Scientific Board, but the knowledge of experienced physicians who have had long and close contact with the problems of drug abuse, and finally the collective wisdom of the medical profession in California as expressed through its leaders on the Council and its representatives in the House of Delegates. Altogether the report is an example of an important statement by organized medicine and of how such a statement can be developed within the framework of this state association.

—MSMW